

PRICE
15¢

TECHNOLOGY DEPT:

PUBLIC LIBRARY

DEC 16 1940

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



December 14, 1940

Birth of Cold Light

See Page 382

A SCIENCE SERVICE PUBLICATION

Do You Know?

On a battleship carrying 1,500 men, 500 are assigned to man the *guns* in time of action.

A photoelectric meter for measuring *vitamin A concentration* in fish oils has been devised.

Pine needles are one of the sources of Vitamin C found worth gathering in Soviet Russia.

The *carpet shark* of Australia reminds some people of the color pattern in an old-fashioned carpet.

A Brazilian factory for making plastics from surplus *coffee* will use about 3,000 bags of coffee monthly.

The *earth* gains about 100,000 tons weight in a year from meteoric material, mostly dust, from the sky.

Pearls require contact with skin moisture to retain their luster, and will dry out if long stored away.

From cottonseed hulls, heretofore mainly a waste material, a new *plastic* has been developed, in Tennessee.

Almost any type of steam locomotive on American railroads can be identified by the arrangement of the *wheels*.

Nutritionists say that there is no harm in eating different *fruits* together for fear of combining different acids—nature sometimes combines acids in the same fruit.

QUESTIONS DISCUSSED IN THIS ISSUE

Most articles which appear in SCIENCE NEWS LETTER are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.

ARCHAEOLOGY

Where are airplane flights being conducted over ruins they did not cause? p. 378.

Where can we see the serene beauty of the Acropolis in case bombs destroy the original treasure? p. 372.

ASTRONOMY

When can you see fragments of a comet watched by your Stone-Age ancestors? p. 375.

Where is the new white dwarf star? p. 373.

BIOLOGY

What proportion of sponges were killed by the recent epidemic? p. 383.

CHEMISTRY—AGRICULTURE

What substitute has been found for linseed oil meal in cattle feed? p. 376.

CONSERVATION

What Christmas greens should you boycott? p. 383.

ENGINEERING

How can the tanks storing explosive gases be prevented from exploding? p. 376.

What new college courses are being planned to fill a defense shortage? p. 371.

What new principle is employed in a new light steam engine? p. 376.

GENERAL SCIENCE

What are the rarest and most spectacular phenomena in the universe? p. 374.

What new hope is offered for rescue of anti-Nazi intellectuals? p. 377.

GEOGRAPHY

Why is Kra important in world affairs? p. 376.

ICHTHYOLOGY

What characteristic of the ocean accounts for the wealth of West Coast fisheries? p. 376.

MEDICINE

What method of treatment has been found successful for brain tumors? p. 380.

What method is used to shorten the longer legs of cripples? p. 380.

NUTRITION

What four problems will receive first attention in national nutritional program? p. 371.

PHYSICS

How does cold light serve in television? p. 382.

Who will measure cosmic rays near the South Pole? p. 377.

PHYSIOLOGY

What dangers may be encountered by amateurs experimenting with colchicine? p. 382.

PSYCHOLOGY

How can you satisfy yourself that swing is becoming great art? p. 377.

PUBLIC HEALTH

What should you do if the influenza epidemic strikes your community? p. 373.

An agriculturist predicts that California, now growing 11 varieties of *wheat*, will grow only about half that number in a few years, due to scientific breeding of improved, disease-resistant types.

The male and female of some kinds of *birds* have special sounds of greeting when they meet.

The *boundary* between the United States and Canada is 3,987 miles long, 2,198 miles of it being water.

America *mobilized* about 350,000 men for the American Revolutionary War, 2,129,000 for the Union forces in the Civil War; 4,791,000 for the World War.

Caves once worked for sand have been turned into air raid shelters in England, with improvements of ventilation and bomb and sound-proofing.

Europe has been quicker to use *aptitude tests* in placing industrial workers in jobs than America, says an American psychologist.

SCIENCE NEWS LETTER

Vol. 38 DECEMBER 14, 1940 No. 24

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 2101 Constitution Avenue, Washington, D. C. Edited by WATSON DAVIS.

Subscriptions—\$5.00 a year; two years, \$7.00; 15 cents a copy. Ten or more copies to same address, 5 cents a copy. Back numbers more than six months old, 25 cents.

In requesting change of address, please give your old address as well as the new one, at least two weeks before change is to become effective.

Copyright, 1940, by Science Service, Inc. Reproduction of any portion of SCIENCE NEWS LETTER is strictly prohibited. Newspapers, magazines and other publications are invited to avail themselves of the numerous syndicate services issued by Science Service.

Cable address: Scienserve, Washington.

Entered as second class matter at the post-

office at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark. U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and in the Engineering Index.

Members of the American Association for the Advancement of Science have privilege of subscribing to SCIENCE NEWS LETTER at \$3 a year.

The New York Museum of Science and Industry has elected SCIENCE NEWS LETTER as its official publication to be received by its members.

Advertising rates on application. Member Audit Bureau of Circulation.

SCIENCE SERVICE is the Institution for the Popularization of Science organized 1921 as a non-profit corporation.

Board of Trustees—Nominated by the American Association for the Advancement of Science: Henry B. Ward, University of Illinois; Edwin G. Conklin, American Philosophical Society; J. McKeen Cattell, Editor, Science. **Nominated by the National Academy of Sciences:** R. A. Millikan, California Institute of Technology; Harlow

Shapley, Harvard College Observatory; William H. Howell, Johns Hopkins University. **Nominated by the National Research Council:** Ross G. Harrison, Yale University; C. G. Abbot, Secretary, Smithsonian Institution; Harrison E. Howe, Editor, Industrial and Engineering Chemistry. **Nominated by the Journalistic Profession:** O. W. Riegel, Washington and Lee School of Journalism; A. H. Kirchhofer, Buffalo Evening News; Neil H. Swanson, Baltimore Evening Sun. **Nominated by the E. W. Scripps Estate:** Karl Bickel, E. W. Scripps Co.; Warren S. Thompson, Miami University, Oxford, Ohio; Harry L. Smithton, Cincinnati, Ohio.

Officers—Honorary President: William E. Ritter, President; Edwin G. Conklin, Vice-President and Chairman of Executive Committee; Harlow Shapley, Treasurer; Harry L. Smithton, Secretary; Watson Davis.

Staff—Director: Watson Davis. **Writers:** Frank Thone, Emily C. Davis, Jane Stafford, Marjorie Van de Water, James Stokely. **Photography:** Fremont Davis. **Librarian:** Minna Gill. **Sales and Advertising:** Hallie Jenkins, Austin Winant. Correspondents in principal cities and centers of research.

NUTRITION

Appoint Steering Committee For National Nutrition Program

Recommendations, as Fast as They Are Decided Upon, Go To Agriculture Extension Director for Action

NATIONAL defense will be advanced at American dinner tables under the guidance of a group of the nation's scientific experts on food. This group is the Committee on Food and Nutrition of the National Research Council, appointed at the request of Miss Harriet Elliott, head of the consumer division on the National Defense Advisory Commission.

The English will be eating in their bread more vitamins for health and morale, beginning early next year, as a result of a war health measure advised by their national food research council. Without waiting for war, America is going to have a national nutrition program to improve the health of her population, some 45,000,000 of whom are said now to be eating inadequate diets and consequently suffering from various degrees of malnutrition.

Miss Elliott is determined to do something about this ominous situation. Before starting the program, she has called for the advice of the nation's leading experts on nutrition, dietetics, home economics, agricultural economics and food processing.

Four main aspects of the problem to be studied were decided on at the first meeting of the committee. These are: 1. Improvement of white flour, well recognized to be deficient in minerals and in the B vitamins, necessary for health and morale; 2. Improvement of another American dietary standby, sugar, which likewise has been deprived of the minerals and vitamins contained in the sugarcane or beets from which it is made; 3. Improvement in the nutritional quality of the edible fats; 4. Development of a plan for teaching the population what it needs to know about food and nutrition.

As fast as recommendations can be decided on by the committee, they will be passed along for appropriate action to Dr. M. L. Wilson, director of extension, U. S. Department of Agriculture, who will direct a national program of nutritional education.

Dr. Russell M. Wilder, of the Mayo Clinic, is chairman of the new committee

which includes, besides the scientists from civil life, liaison representatives from the American Red Cross and U. S. government bureaus.

This committee, it is pointed out, will concern itself with the nutrition of the general population. Nutritional problems of the Army and Navy are being studied in an advisory capacity by another National Research Council committee. Members of the new committee on food and nutrition are: Dr. Russell M. Wilder, Mayo Clinic; Prof. John N. Black, Harvard University; Dr. Henry Borsook, California Institute of Technology; Dr. F. G. Boudreau, Milbank Memorial Fund; Dr. George R. Cowgill, Yale University School of Medicine; Prof. Joseph S. Davis, Stanford University; Prof. C.

A. Elvehjem, University of Wisconsin; Dr. Icie Macy Hoobler, Children's Fund of Michigan; Dr. Philip C. Jeans, State University of Iowa; Dr. Norman Jolliffe, School of Medicine, New York University; Prof. Charles Glen King, University of Pittsburgh; Dr. James McLester, University of Alabama; Dr. L. A. Maynard, Plant, Soil and Nutrition Laboratory, Cornell University; Dr. Helen S. Mitchell, Massachusetts State College; Dr. Lydia J. Roberts, University of Chicago; Dr. W. C. Rose, University of Illinois; Cullen Thomas, General Mills Corporation; Dr. R. R. Williams, Bell Telephone Laboratories, and Dr. John B. Youmans, Vanderbilt University.

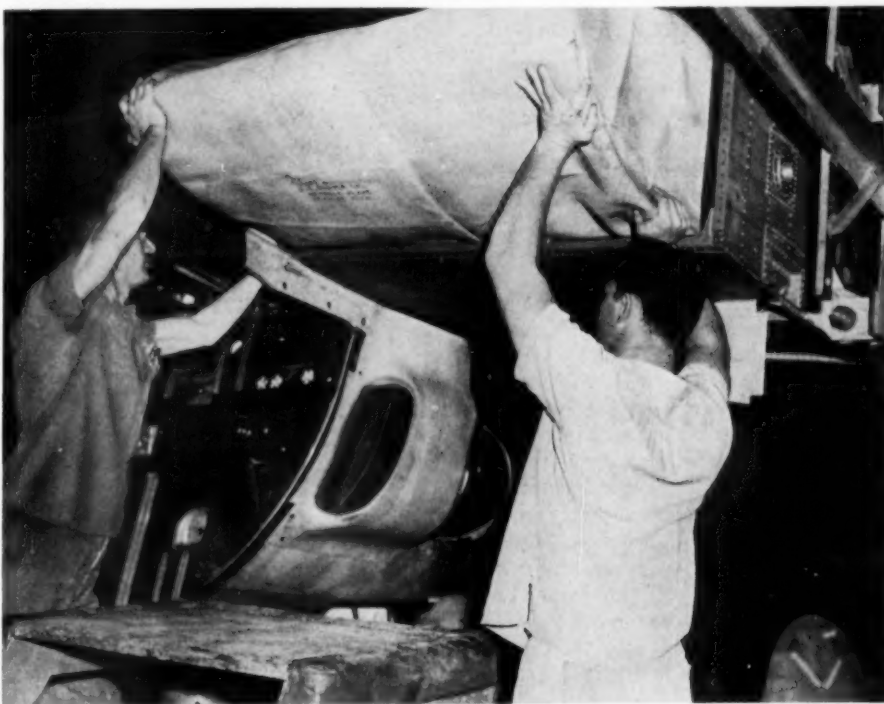
Science News Letter, December 14, 1940

ENGINEERING

Shortage of Engineers For Aircraft Foreseen

IN ARMING America with airplanes and other machines of war, there will soon be an appalling shortage of graduate engineers capable of doing design and production.

What the colleges are able to do to increase the supply through regular courses



SELF-SEALING

When a machine gun bullet penetrates the airplane gasoline tank shown above, there is no dangerous leak, for the hole is immediately and automatically sealed. This, one of the first photographs to be released, shows the tank, a development of the United States Rubber Co., being installed in a bomber under construction in a California plant of Douglas Aircraft Co. A large quantity of these tanks have already been delivered for installation in both American and British planes.



LIFE LIKE

It looks like an actual photograph of the original Maya stela, but is a painting done by Joseph Lindon Smith's striking technique.

will not supply the demand. Engineering educators are now planning to develop short-term, intensive courses to train high school graduates and liberal arts college students to fill the emergency.

Government and educators alike are alive to the serious situation. A report by the New York Committee on Engineering Training for National Defense just issued, is the latest evidence that the nation faces a lack of technically trained men so critical that unless emergency measures are taken the defense program, hardly underway, will suffer.

Aircraft production in the New York area alone, only 21 companies employing 38,300 men or a fraction of the total aviation industry, will need 6,000 new engineers within the next year, whereas all the engineering schools of the nation will turn out only 12,000. In non-aviation industries of the New York-New Jersey area, 1,500 more engineers will be needed, which is more than the engineering colleges in the area can provide.

The New York report, prepared at the request of the U. S. Office of Education, predicts that the full force of the defense program has not yet been felt. There is danger, it is intimated, that the shortage of engineers may be aggravated by the reluctance of industrial managers

to secure draft exemption for their essential technically trained personnel.

An attempt may be made to discover engineering graduates in other lines of work and return them to engineering work.

Engineering colleges may hold classes during the summer and graduate in February engineers who otherwise might finish in June.

Schools in the shops themselves may

be established to allow employees to fit themselves for better jobs.

In some areas public technical high schools are being used almost on a 24-hour basis to train mechanics to meet the expanding defense program. The engineering colleges may in the next few months find themselves providing the same service for technical engineering education.

Science News Letter, December 14, 1940

ARCHAEOLOGY

Ruins Now Menaced by Bombs Preserved in America in Art

Faithfully Accurate Paintings Are Designed To Show Archaeological Treasures As They Appear In Our Time

IF A BOMB smashes the Acropolis in Athens, America has two faithful paintings of its serene beauty by Joseph Lindon Smith, New England artist, who has spent 50 years safeguarding the world's archaeological treasures on canvas.

"One Acropolis painting is in New York in a private collection and one is at Harvard—I think," said Mr. Smith, in an interview.

He was a trifle apologetic at not recalling off-hand where all of his paintings are preserved. He has done hundreds.

About 200 of this artist's paintings of Egypt's temples, tomb decorations, and other old, old art wonders, also endangered by indiscriminate air war, are preserved at the Boston Museum of Art. In Egypt, only a few miles from Sak-kara's famed ruins, is an Australian camp. The Cairo Museum's roof is notably not very strong. It leaks. Egypt's treasures have thus far escaped bombs, but no one knows for how long.

Here in peaceful, but alert, Washington, nearly 30 of Mr. Smith's paintings of America's own ancient Mayan splendors are holding public court at the Carnegie Institution of Washington. Twelve of these paintings have been acquired by the Carnegie Institution, to become permanent exhibits in its headquarters.

Mayan Indians, who gave prehistoric America its greatest aboriginal civilization in Mexico and Central America, were fine artists, Mr. Smith says appreciatively. They are fittingly called the Greeks of ancient America:

"Their early sculptures are as great

as those of any early civilized country," in his opinion.

Mr. Smith's paintings bring the observer close to the fine, vigorous carving of Mayan temple decorations and monuments. He paints standing within a few inches of his subject. He likes to paint a piece of sculpture life-size, as it is "in our time." Sometimes that means showing the damage of centuries of neglect and weathering. Sometimes it means showing the exact effect of red, blue, and other gay colors that the Indian artists used in giving life to their work, just as the Greeks colored their statues and friezes.

One of the most recent revelations from buried temples at Chichen Itza in Yucatan is the Jaguar Altar which looks exactly like a Christmas toy animal in its red paint and polka-dots of green jade. Painted by Mr. Smith, the remarkable colors of this image are now shown to people in the United States for the first time. In Yucatan, the Jaguar Altar is guarded in a zoo-like cage. When Mr. Smith was permitted to paint it, a Mexican guard, gun in hand, was locked in the cage with the artist. To Mr. Smith's amusement, the guard counted the valuable jade disks set in the jaguar and announced pointedly, "Seventy - three, Señor." When the picture was finished, Mr. Smith counted them, too, and announced, "Seventy-three, Señor." One of the disks had previously disappeared, hence the super-caution.

To observers accustomed to the stern and warlike scenes that Mayan Indians customarily portrayed in their art, there

is one bas relief which Mr. Smith has recorded which is a surprise. It shows a profile of classic sweetness. Whether the Indians thought their fierce gods and

heroes beautiful, Mr. Smith points out, we cannot know. They may have placed other goals far ahead of beauty, in their art.

Science News Letter, December 14, 1940

PUBLIC HEALTH

Public Health Officials Battling Flu Epidemic

No Satisfactory Control Measures Available But Pneumonia Can Be Effectively Fought with Serum

PUBLIC HEALTH officials, engaged from the beginning of the outbreak in battling the epidemic of influenza, which began on the Pacific coast, have little hope of stopping its spread.

They will, however, work intensively to learn more about the disease and the viruses that cause it.

"Influenza travels as fast as transportation," Dr. Frank L. Horsfall, Jr., Rockefeller Foundation flu fighter, said, "That means the speed of airplanes," he added.

A large supply of the new double-virus vaccine against influenza, developed by Dr. Horsfall and Dr. Edwin H. Lennette through a lucky accident in which influenza-infected ferrets got distemper at the same time they got flu, is available in California, and is being used, but results are not yet available. The vaccine has not yet had a trial-by-epidemic of its protective value.

Vaccinating in the face of an epidemic may not provide such a trial, nor be effective as control measure even if the vaccine turns out to be effective in protecting against influenza. The reason for this is that influenza travels so quickly that it is difficult to get people vaccinated before they are exposed to the disease.

Dr. John W. Oliphant, U. S. Public Health Service, is in California, but not for the purpose of controlling the epidemic. No satisfactory methods of controlling this disease have yet been developed.

Dr. Horsfall is not going to the present scene of the influenza epidemic in California, either, nor is Dr. Lennette. The Rockefeller Foundation, Dr. Horsfall explained, has a well-trained group of influenza investigators, under the leadership of Dr. M. D. Eaton, already established in Berkeley with the Cali-

fornia State Department of Health. No word has been heard from these men since first notice of the epidemic on Nov. 30, presumably because they are too busy, "working day and night," to find time for official reports.

The most important thing to do first in an influenza epidemic, Dr. Horsfall pointed out, is to find which virus is causing the cases.

Two viruses that cause epidemic influenza have been discovered. They are called Influenza A virus and Influenza B virus. The B virus was identified by Dr. Thomas Francis, Jr., of New York University College of Medicine. This virus was the cause of epidemics near New York City and in North Carolina early this year. It also was the cause of an epidemic early in 1936, Dr. Francis discovered.

More strains may exist. Difficulty in developing protective vaccines against the disease may be due to the fact that there are so many strains. There might have to be a separate vaccine for each strain of virus. Fundamental knowledge of this sort is what Dr. Oliphant and other flu fighters are seeking, so that efforts to control the disease can proceed more effectively.

Like Dr. Horsfall and the others, Dr. Francis is eager to know which virus is causing the present California epidemic. He does not plan, however, to go out to California.

Dr. Francis considers that just because there is war in Europe is no reason to expect a big influenza epidemic this winter. He pointed out that the worldwide influenza epidemic of 1918 was one of the few in history to come with a war. We had a war in this country between 1861 and 1865, but nothing like influenza accompanied it, he pointed out. The year 1890 saw another big influ-

enza epidemic but there was no war then.

In 1918, unlike the present situation, the influenza epidemic in general affected the eastern part of the United States first and traveled more or less rapidly from east to west and from north to south.

Crowded conditions in army camps and naval training stations were believed to play an important part in the spread of the disease in 1918. Such conditions are not likely to prevail this winter. Army officials now receiving the first contingents of men for training under the Selective Service Act are well aware of the importance of avoiding crowding in order to cut down the spread of influenza and other diseases.

Health measures advised in case of an influenza epidemic are the same this winter as they have been for the past 22 years or more: Avoid crowds. Keep up resistance by proper diet, rest and outdoor exercise. Go to bed at the first sign of an influenza attack and call a doctor. Stay in bed until the doctor says it is safe to get up.

The most cheerful feature of the present situation is the fact that pneumonia, the great killer in past influenza epidemics, can be effectively fought by prompt treatment with serum or one of the new sulfa drugs or a combination of these.

There is some possibility that the Pacific Coast outbreak will be localized there, several points in the East early this week reporting no increase in influenza.

Science News Letter, December 14, 1940

ASTRONOMY

Find New Super-Dense Star In Constellation of Cygnus

AN ADDITION to the rare class of white dwarf stars, which have densities as much as a million times that of water, is announced by Dr. G. P. Kuiper, of the McDonald Observatory of the University of Texas and the University of California.

It is in the constellation of Cygnus, the swan, just above the top of the familiar "northern cross," visible in the western evening sky. The star, known by its catalog number as Ross 198, is of the fifteenth magnitude, and not visible except with the largest telescopes.

The faint companion to Sirius, the "dog star," now seen in the evening to the southeast, was the first white dwarf to be discovered. Though it has as much stuff in it as the sun, this is concentrated into a globe about as big as the planet

Uranus, one-thirtieth of the sun's diameter. Thus, a pint of its material would weigh about 20 tons.

Explanation of this super-density is believed to be that the atoms are completely ionized, or broken into bits, by the extreme temperatures that prevail inside, around two billion degrees Fahrenheit. Thus, the wood in a pile of boxes, corresponding to the atoms and like them containing a great deal of

empty space, takes up a lot more room than if the same boxes are broken into small pieces.

Just how dense is the newly discovered white dwarf, Ross 198, remains to be determined. However, another star of the same class that Dr. Kuiper discovered a few years ago is estimated to be a thousand times as dense as the companion of Sirius.

Science News Letter, December 14, 1940

GENERAL SCIENCE

Supernovae, Rarest Phenomena, Found To Be Of Two Types

Even Members of Fainter Group are a Hundred Times As Bright as Ordinary Novae; Others 1,000 Times

EXPLODING STARS, known to astronomers as "supernovae" and described as "the rarest and most spectacular phenomena recorded in the study of the observable region of the universe," are of two types. This is shown by a survey conducted jointly by the Mount Wilson Observatory of the Carnegie Institution of Washington and the Palomar Observatory of the California Institute of Technology.

Some results of this investigation, of which the exploratory phase is now completed, are shown in the Carnegie Institution of Washington's annual exhibition, which opened on December 13.

Ordinary "new" stars reach a maximum brightness only about 100,000 times that of the sun. Such a star, says the Institution's catalog of the exhibition, "becomes unstable, swells up, and blows off its cover." Several of these occur each year in our own Milky Way system, and presumably they are about as frequent in the millions of similar systems observed by astronomers. In the more distant ones, even when brightest, they are not sufficiently brilliant to be apparent.

Until the joint investigation was inaugurated, six years ago, only fragmentary information about supernovae, which are far more brilliant, was available. Now it is found that one appears in each star system about once in three to six centuries. The last in our system was in 1572.

"All well observed supernovae seem to follow closely one of two patterns," it is announced, "and are distinguished as groups I and II. Those of group II are the fainter (average maxima about

10,000,000 suns) and their spectra, that is, analyses of their light, resemble the spectra of normal novae on an enhanced scale. Practically all the features in the spectra have been identified. The spectra of group I (average maxima about 100,000,000 suns) are quite different, and so strange that scarcely a single feature has yet been identified with certainty. These spectra evidently reflect the sudden release of energy on an enormous scale, and their final interpretation should contribute information concerning the behavior of matter under extreme conditions."

Machines Develop Pressures

PRESSURES in the laboratory as great as three million pounds per square inch, which duplicate those at a depth of 300 miles below the earth's surface, or about a twelfth of the distance from surface to center, are proving a powerful new tool to scientists in their studies of what is happening in the earth itself.

First results of researches made with such pressures in the Geophysical Laboratory of the Carnegie Institution of Washington are revealed as part of the annual exhibit of the Institution.

To obtain such pressures it is necessary to have a material that will withstand them. Tungsten carbide, known as carboloy, is one that has been widely used, but even with this the trick of "a bomb within a bomb" is needed.

"A carboloy piston 1.13 inches in diameter (roughly one square inch in cross section) will support a load of about

375 tons before rupture," it was stated. "It is one of the strongest known materials. This compressive load thus appears to set up an upper limit to the pressure obtainable in a single-stage apparatus. If, now, we support this piston laterally by a pressure of, say 250,000 pounds per square inch, on the basis of ordinary elastic theory we can expect the piston to support a load of about 500 tons as an upper limit. Actually, however, it will withstand much more than 500 tons, because the lateral confining pressure acts also to increase its strength. A piston supported in this manner withstands a load of as much as 1500 tons.

"This phenomenon has been utilized in the apparatus for work at very high pressures. The apparatus consists of a two-stage or cascaded arrangement of pressure vessels, that is, a bomb within a bomb. A pressure of 300,000 pounds per square inch developed in the first stage or outer pressure vessel acts on the second stage or inner pressure assemblage to support and also to strengthen it, and thus allows the generation of a pressure about ten times that in the outer vessel. The advantage of this two-stage cascade apparatus, therefore, lies not only in the circumstance that the second stage immediately doubles the pressure range, but also, in the great increase of strength caused by the confining pressure on the inner bomb. The pressure in each stage is developed by means of a piston, and the mechanism is so designed that the pressure in either stage may be varied independently of the other."

Plant Fossils Evidence

EVIDENCE that the continents have "stayed put" during the past 60 million years, and have not been drifting slowly around like rafts on a millpond as one theory holds, is presented by successive deposits of plant fossils representing various periods in American geological history. These are illustrated in exhibits arranged by the Institution's division of plant biology, with the collaboration of the Museum of Science and Industry of New York.

If all present continents are fragments of one original super-continent, that broke up about 60 million years ago and let its fragments go a-drifting, then we could expect lines of distribution of plant fossils to have no necessary relation to the distribution of plants today. As a matter of fact, however, Institution paleobotanists have found, given species in past ages were distributed very much as plants of today are distributed: push-

ing farther north along the continental borders, where weather is warmer in winter, and dipping far toward the south in the interior, where weathers are severe.

This is strong indication that our continent has remained in essentially its present position since Eocene time, and that plant populations have done the drifting, moving slowly southward as the climate cooled, and shifting a little

to the north again during warmer interludes.

Other exhibits will illustrate work done recently by Institution scientists on such diverse subjects as the gene, or basic physiological unit of heredity, the interpretation of Maya religion as recorded in the architecture, art and hieroglyphic writings of that once great people, and the phenomena of volcanic activity.

Science News Letter, December 14, 1940

ASTRONOMY

Relation Is Traced Between Meteors and Encke's Comet

If You Saw "Shooting Stars" During October or November, They May Have Been Parts of Stone-Age Wonder

IF, DURING the autumn, you notice a shooting star that seems to emerge from the constellation of Taurus, in the eastern evening sky at present, you are probably seeing the remains of a huge comet that may have been watched with fear and wonder many thousands of years ago by our late Stone Age ancestors.

These meteors are members of the Taurid shower, so called because of the direction from which they come. According to Dr. Fred L. Whipple, Harvard astronomer who reports on his researches in *The Telescope* (Nov.-Dec.), the Taurids seem to be cousins of puzzling Encke's comet. It comes around once every three years and four months, but is never visible to the naked eye.

From observations of Taurid meteors, with special cameras, he finds that their speed around the sun varies from 23.3 to 23.5 miles per second. This shows conclusively that they are part of the solar system, moving about the sun in a closed path. Had they been moving faster than 26.5 miles per second, they would have come in from outer space.

This, indeed, had been suggested in the past, but Dr. Whipple finds the reason for such an erroneous conclusion. The meteors that are seen in early November have longer and narrower orbits than those that come in late October, and this led the earlier astronomers astray.

Dr. Whipple also finds that the paths of the meteors are quite similar to that of the comet, except that the planes of the meteor and comet orbits are at an angle of about 12 degrees. This would seem to preclude the possibility of a connection, but he has worked out a new mathematical theory for the pull of Jupi-

ter on the comet. The plane of the comet's motion, he demonstrates, wobbles over a long period of time. Many thousands of years ago the orbits were nearly the same.

"The most reasonable conclusion to be drawn from this evidence," Dr. Whipple says, "is not that the Taurid meteors arise from Encke's comet but rather that they both have a common ancestor, some large comet that broke up into several smaller ones."

"One of the smaller descendants can still be seen alive as Encke's comet, while only the skeletal remains of others occasionally collide with the earth to produce showers of meteors. It is interesting to know just how long ago the parent comet met with disaster and we may estimate from the present data that the break-up probably occurred some five thousand to fifteen thousand years ago."

First observed in 1786 by a French astronomer named Mechain, Encke's comet has been watched on forty or more visits since then. Its three-and-a-third-year period is the shortest of any periodic comet.

Unlike most comets, the name commemorates not the discoverer, but Johann Franz Encke, a German, who first showed that it was a periodic comet. He also made an exhaustive mathematical study, which revealed that its period was gradually shortening. Between 1819 and 1914 this amounted to about two and a half days. However, after Encke's death in 1865 the rate of decrease was considerably reduced and in recent years the period has hardly changed at all.

Encke's suggestion that the decrease was the result of some cloud of resisting material through which the comet passed has thus been discarded, because, says



WINGS AT THE WINDOW

Judy, a baby rosebreasted grosbeak, being fed by Mrs. Ada Clapham Govan, author of "Wings at My Window," (Reviewed, SNL, this issue)

Dr. Whipple, "a resisting medium dense enough to affect the comet's motion could hardly disappear in a few years."

The reason for this change is an astronomical puzzle. So, indeed, is the fact that the comet still exists. Because it moves in a small orbit, says Dr. Whipple, it "is activated by fairly intense sunlight at all times and brightens up every three and one-third years when it approaches the sun. How it can continue to show indefinitely as a hazy diffuse object and not be completely dissipated is truly a mystery."

Science News Letter, December 14, 1940

The world's most northern highway is the macadam road in Finland, running 310 miles north from a rail head near the Arctic Circle to an ice-free Arctic Ocean port.

● RADIO

P. L. Ricker, president of the Wild Flower Preservation Society and botanist of the U. S. Department of Agriculture, will discuss "Our Disappearing Christmas Greens," as guest scientist on "Adventures in Science" with Watson Davis, director of Science Service, over the coast to coast network of the Columbia Broadcasting System, Thursday, Dec. 19, 3:45 p.m. EST, 2:45 CST, 1:45 MST, 12:45 PST. Listen in on your local station. Listen in each Thursday.

ENGINEERING

Pressure Tanks Made Safer By Disks Which Burst

EXPLOSIONS of tanks used in industry to store dangerous gas mixtures can often be prevented by inserting in their walls disks of a material which gives way more easily than the tank itself, Merl D. Creech, of Oklahoma City, told the American Society of Mechanical Engineers meeting in New York.

While such tanks are usually provided with safety valves, they do not operate rapidly enough to prevent a possibly disastrous explosion, he said.

Mr. Creech described experiments he has conducted with a special tank in which he actually exploded mixtures of air with the combustible gas propane. Meters were attached to the side of the tank to determine the pressures before and after the explosions. The tank was sufficiently strong so that it did not burst even when made without the safety disk.

Under these conditions, pressure increased as much as seven or eight times when the explosion occurred. With a rupture disk four inches in diameter, the increase was only about 4.25 times and it was still less with larger disks, being about 2.5 times with a 12-inch disk.

Though emphasizing that his results are still preliminary, he expressed the opinion "that by using a higher factor of safety in designing the vessel together with a rupture disk of suitable size, every vessel containing an explosive combustible mixture can be protected. For many of the less violently explosive mixtures, a rupture disk alone will give absolute protection from a destructive explosion."

Science News Letter, December 14, 1940

GEOGRAPHY

Kra May Set Japan On Road to Mandalay

THE Isthmus of Kra, danger neck of land in southern Thailand (Siam), is now a likely goal for Japan's conquest maneuvers in southeastern Asia, and its control would even set Japan on a road to Mandalay.

That Kra is a name to pin in your hat, because it may soon become a hot spot of the Far East is forecast by Dr. Joseph E. Spencer, University of California geographer, who has returned from seven years in the Orient. A logical climax of Japan's thrust into Indo-China, if successful, he points out, would be to

move west from the south tip of Indo-China to the long, dangling Malay Peninsula.

By striking at the narrow Isthmus of Kra, where the peninsula is less than 70 miles wide, Japan could cut off Great Britain's Gibraltar of the East, Singapore at the southern end of the peninsula. Not only would Great Britain have one more enemy angle to watch, but her position diplomatically would be weakened in Thailand's estimation.

For some years, Japan has had an eye on the isthmus, and has sought permission to cut a canal through it, but Thailand has never welcomed the Japanese in.

If Japan could establish herself there now, she would be close to Burma, which some observers believe is included in Japan's conquest and expansion program. But an advance toward India would bring Japan up against not only irate Britain but disapproving Soviet powers, who would like India themselves, if it is to change hands.

Science News Letter, December 14, 1940

CHEMISTRY—AGRICULTURE

Urea in Cattle Ration May Mean Future Savings

UREA, a simple nitrogen compound hitherto used principally in fertilizers and plastics, can be mixed with cattle feed as a substitute for more expensive sources of nitrogen, nutrition researches at the University of Wisconsin indicate.

Comparative feeding experiments, conducted by I. W. Rupel, G. Bohstedt, M. I. Wegner and E. B. Hart, showed that groups of cows receiving urea as their principal source of nitrogen produced as much milk as similar groups which got their nitrogen in the form of the considerably costlier linseed oil meal.

The experiments lend support to the theory that bacteria in the digestive tract of cattle assist in their nutritional processes. When natural stomach juices from the animals were mixed with urea and cattle feed, under proper chemical and physical controls, as much as 95% of the urea disappeared, to reappear in the structure of bacterial cells. Furthermore, when some of the contents were withdrawn from the stomach of a living heifer, after feeding, it was found that all the urea had been converted into ammonia within an hour, and in four or five hours the ammonia had disappeared, presumably going into the bodies of bacteria as protein.

Further experiments on the feeding value of urea are now in progress.

Science News Letter, December 14, 1940

IN SCIENCE

ENGINEERING

New Type Steam Engine Gives High Efficiency

A NEW type of steam engine which yields one horsepower for each five pounds of weight, comparing favorably with gasoline engines used for automotive service, was described to the meeting of the American Society of Mechanical Engineers in New York.

Technical details of the engine were given by S. L. G. Knox, of Englewood, N. J., who designed it, and Prof. J. I. Yellott, of the Illinois Institute of Technology, who has conducted tests upon it.

The engine, which weighs 450 pounds, and gives a maximum of 90 horsepower, is a reversible one, in which changing the direction of the flow of steam reverses the direction of rotation. Its outstanding feature, the engineers said, "is the valve gear, by which a number of useful functions are performed without introducing more moving parts than the minimum number required for a simple non-reversing engine with the same number of cylinders."

The boiler employs a new principle to obtain forced circulation. An impeller in a lower drum forces water through a number of vertical tubes on the other side of which are the heated gases from the flames of the oil burners which provide the heat.

Science News Letter, December 14, 1940

ICHTHYOLOGY

Ocean Currents Important In Distribution of Fish

FISH in the sea, no less than fish in rivers, are governed in their movements to a considerable extent by water currents, states Dr. Harald U. Sverdrup, director of the Scripps Institution of Oceanography.

Upwelling currents, that bring water rich in marine food from the depths to the surface, are an especially important factor in determining the places where fish congregate to feed. There are strong upwelling currents along most of the California coast, which account to a considerable extent for the wealth of West Coast sardine and other fisheries.

Science News Letter, December 14, 1940

NE FIELDS

GENERAL SCIENCE

Anti-Nazi Intellectuals May Come to New World

HOPE has arisen anew that many intellectuals and others in real danger of liquidation by the Nazis may be released from French prison camps in order that they may come to the New World.

To the American Committee to Save Refugees, headed by Prof. Walter Rautenstrauch of Columbia University, New York, there has come news that official Vichy government decree assures the release of all interned refugees from Germany, Austria, Danzig and Sudeten Czechoslovakia who can prove that other countries are willing to offer them hospitality.

Mexico and several other Latin American countries have announced that they will open their doors to refugees, especially those of scientific, medical and other professional and trade attainments.

Along with the Germans interned, there are thousands of Spanish Loyalists who have fled from Franco's Spain. Parts of Latin America are open to them also and another New York committee is raising funds to provide a boat to bring them westward.

Science News Letter, December 14, 1940

PSYCHOLOGY

Swing Is Art And Is Becoming Great Art

SWING is art, and it is recently becoming great art.

"The difference between Beethoven's Fifth Symphony and Benny Goodman's 'Opus 1/2,'" concludes Dr. J. F. Brown, psychology professor at the University of Kansas, "is one of degree, and not one of kind."

Art, he explains in a new textbook, *The Psychodynamics of Abnormal Behavior* (Reviewed SNL, this issue), is the expression in more or less disguise of conflicts or problems that are a part of life.

Songs are popular when the problems which are their content are easily recognized—when the disguise is thin. Usually the lyrics of swing music speak of

unrequited love, a problem of deep concern to boys and girls of college and high school age. And they speak pretty frankly.

As art disguises its content, uses technically difficult and distorted expression forms, and requires more competence of the performers, it becomes "great" art.

If you want to satisfy yourself that popular music is becoming "greater" art, just listen to records made in the early twenties and compare these with the latest recordings of the same songs.

From the old records you will hear a thinly orchestrated and purely melodic recording of the verse followed by as many identical repetitions of the chorus as space would allow. The monotony is tiring to the ear.

Some of Benny Goodman's and Bob Crosby's and Count Basie's widely swung choruses represent variations as complex, Dr. Brown insists, as some of Brahms's. You can even listen to modern swing in a concert or "jam session."

As swing gets farther away from the simple love-making of the dance, fewer individuals will be able to follow it, it will become esoteric and no longer popular, he predicts.

Swing, according to Dr. Brown's analysis, is not only art, it is good psychology—or psychoanalysis. Freud himself would have approved a title like "You Remind Me of My Mother" or the use in love songs of "Mama" and "Daddy."

The song writer, like the psychoanalyst, recognizes the significance of dreams—"You Can't Stop Me from Dreaming," "I'll See You in My Dreams," or "I Wake Up Smiling."

"Fall in love, fall in love, says my heart . . . but each time that I'm almost in your arms, this old school teacher brain of mine starts ringing false alarms." These words from a recent popular song might be translated into technical language and find their place in a psychology textbook.

Hate, Dr. Brown says, is seldom expressed in popular songs except in war time. For hostility, go to the comic strip or the animated cartoon.

Science News Letter, December 14, 1940

METALLURGY

Make Non-Magnetic Steel With High Resistance

STEEL that is non-magnetic and which has high electrical resistance, adapting it for certain technical uses, has recently been developed. (*Jessop Steel Co.*)

Science News Letter, December 14, 1940

PHYSICS

Cosmic Ray Measurements From Little America

FIRST observations to determine the effect latitude has on a recently discovered characteristic of cosmic rays that bombard the earth from outer space are now being made on the trip of the *U.S.M.S. North Star* to Little America to bring back the last of the United States Antarctic Expedition. She sailed from Seattle on Dec. 10. Another supply ship, the *Bear*, sailed in October, and is now in the South Seas.

According to Dr. Serge A. Korff, of the Bartol Research Foundation of the Franklin Institute, Dana Bailey, of the Harvard College Observatory, is making the observations. These will be of the neutrons, electrically neutral particles, that are produced by the cosmic rays. Discovered in 1932, as produced in the laboratory, their connection with cosmic rays has only lately been noticed.

Dr. Korff has designed a new form of counter to measure them, as distinct from the measurements of the other types of cosmic radiation. This consists of a tube containing a gas, boron trifluoride. The neutrons break up the nuclei of the boron atoms, and alpha particles, atomic bullets of another kind, are formed. These are detected in the counter.

Mr. Bailey, who was at Oxford University as a Rhodes Scholar until last spring, sailed from Seattle on December 2 and will be back about the end of April, 1941. He will also bring back two cosmic ray meters of the type devised by Dr. R. A. Millikan, which have been in use at Little America since January 1940. These he will continue to operate on the return voyage.

Dr. Korff expressed the opinion that the year's work at Little America will yield important data on cosmic rays. The meters were installed by Dr. Eric Clarke, now of the Massachusetts Institute of Technology, and have been operated by Dr. F. Alton Wade, senior scientist of the Antarctic Expedition. He took the meters on one flight over Antarctica, which reached an altitude of 22,000 feet.

From the results obtained, especially during the Antarctic night, it may be possible to learn whether cosmic ray fluctuations near the South Pole can be correlated with those here; and whether they have any relation to the earth's magnetic field and magnetic storms.

On Commander Byrd's last expedition, cosmic ray meters were used, but these were of a less sensitive type.

Science News Letter, December 14, 1940

ARCHAEOLOGY

Air Reconnaissance of Peace

Ruins Made by Ancient Conquerors of Iran Studied In Warring World by Aerial Photographic Mapping

By EMILY C. DAVIS

WHEN, in these days of blitzkrieg, an airplane flies over ruins it did not cause, that's news!

But while, in other parts of the world, bombing planes were unloading their destructive missiles to destroy great cities, scientists on a mission of peace have been using the same methods of aerial photography that R. A. F. and Luftwaffe reconnaissance planes employ, to study the work of ancient conquerors, who had far less efficient engines of destruction.

These flights have been made over Iran. (Most of us called it "Persia" when we went to school!) Air-minded American archaeologists have had this unusual privilege through the friendliness of the Iranian people.

As a result of very special arrangements, scientists from the University of Chicago's Oriental Institute have looked down on Cyrus the Great's capital and his empty tomb.

They have mapped the length of the Great Wall of Iran—did you know there was one?

They have surveyed from the air the strongholds of the terrible Old Man of the Mountains, made famous in Marco Polo's adventures.

They have photographed in documentary style, from above, palaces—beautiful even in ruin—of conquerors Darius and Xerxes, at Persepolis. Here is a city swept by fire in the wrath of another conqueror, Alexander the Great. These palaces in their full grandeur of sculptured stairways, terraces, gardens and halls may have been visited by the "fair and beautiful" Queen Esther of the Bible. The King Ahasuerus, whom she wed, is often identified as the Persian Xerxes.

Sharing interests with such memorable sites, and more intriguing to scientific curiosity, are humps and mounds of earth which mark ruined towns and cities, as yet unprobed. Many of these have been mapped and photographed by the flying archaeologists, and some day the most promising may be opened.

Even when these flights were arranged, back in the peacetime year of 1935, Iran looked upon foreign aviators one and all

with such wariness that the American scientists had to obtain permission from the Shah of Iran himself.

To emphasize that Iran was setting no precedent which might result in importing aircraft with less desirable aims than those of archaeological science, the Iranian General Staff stipulated that the archaeological plane, named the "Friend of Iran," remain in Iran when scientific flights ended.

First account of the flying explorations, which were carried out from 1935 to 1937, is now published. Dr. Erich F. Schmidt tells the tale in *Flights Over Ancient Cities of Iran* (Reviewed, SNL this week). His air photographs, surveys and observations will provide much help for groundling digging expeditions, when the world is peaceful enough to permit such work again.

Already, Dr. Schmidt's aerial archae-

ology has been put to use on the ground by more than one expedition.

Following clues obtained during aerial explorations, he himself has found a sanctuary and burials of the mysterious people responsible for the Luristan bronzes—exquisite art which came out of Iran a few years ago to stir the entire art world.

When Dr. Schmidt flew over ruins of Rayy, one of Islam's magnificent old cities, he made photographs which formed such excellent guide maps that his ground expedition which had been working on the ruins could have scrapped its expensive ground surveys. Had the "Friend of Iran" been available when this expedition started digging, both time and funds could have been saved—just one example of how aviation and photography aid the science of archaeology these days.

In fact, aviation partly answers the question, "Why were explorers handicapped in searching for man's past before our time?" Some of the walls, roads



SURVEY FOR SCIENCE

Cyrus the Great rested here, but not for long. His tomb at his capital city, Pasargadae, was plundered by another conqueror's soldiers when Alexander the Great marched in. Weeds grow among the stones of this Persian empire-builder's tomb, seen here in impressive ruin and isolation, from the air. All the photographs illustrating this article are from expeditions promoted by the Mary-Helen Warden Foundation, the Museum of Fine Arts, Boston, the University of Pennsylvania Museum, and the Oriental Institute of the University of Chicago.



"FRIEND OF IRAN"

This is what American archaeologists named their plane, which has enabled them to look down on ancient ruins in Iran, by special permission of the Shah himself. The airplane, shown here at a landing, remains in Iran, by stipulation of Iran's General Staff.

and ruins of man's buried civilizations have become entirely invisible—as walls, roads and ruins—to the people who walk over them. Once an archaeologist gets up into the air, plans of many such places and their most important structures are revealed.

The camera then does its share by recording the vanished cities in pictures which may be combined to form mosaic maps. A whole range of sciences—chemistry, engineering, anatomy, and many others—aid the re-discovery of the past. Aviation makes particularly spectacular feats possible.

Military flyers in the last war, Dr. Schmidt points out, helped the peaceable science of archaeology by noting ancient sites as they flew over Near Eastern countries. British, German and French flyers all spotted ruins of civilizations wrecked long before modern war's destruction.

What it is like to scout for this kind of ancient history can be shared second-hand by following Dr. Schmidt's flying experiences. At first, he says, he was often bewildered by the multitude of ground details displacing one another at great speed. But soon he learned to see faster, and to read and analyze the landscape below.

Flying over Iran he learned to tell—in certain cases by square shape and round corner towers—an Islamic ruin

(later than the seventh century of our era) from Iran's more remotely ancient ruins. In detective fashion, he learned to gauge expertly the antiquity of a buried city partly by its plan and partly by the degree to which its irregularities have been smoothed over and destroyed by time.

Recording the Great Wall of Iran kept the observer working at terrific speed, so many objects of archaeological importance seemed to flash beneath the plane. But many photographic records were made, and results of the explorations show that the Great Wall of Iran stretches considerably beyond limits which have been shown on the Survey Map of India. Dr. Schmidt followed the wall, he believes, to the end and he sighted 31 of its garrison forts.

More than 100 miles, this Iranian version of the Great Wall of China stretched defensively to shut out hordes of feuding nomads from the Siberian steppes. Which Persian ruler determined to block the recurrent invasions, is not yet known. Whoever he was, he did a great engineering job, building the wall with its forts all the way from the Caspian Sea in the west to the mountain barriers in the east.

A flying archaeologist in Iran can look down on results of many a conquest and invasion in the world's turbulent experience.

Dr. Schmidt made aerial photographs

NEW YORK TIMES:

"The place of this really fascinating book is in the family circle and the library of the inquisitive individual."

The Microscopic World

BY FRANK THONE

Illustrated with
many drawings and
photographs

THANKS TO this book you do not need to own a microscope to glimpse into the fascinating world of little living things. For Dr. Thone passes the micro-beasts before us in review and takes us through the micro-forests of bacteria, molds and algae, and helps us to understand where, how and why these things exist, what they mean to us, and how we know about them. Dr. Thone is biological editor for *Science Service* and *Science News Letter*. \$3.00.

JUST OUT!

H. M. PARSHLEY (in New York Herald Tribune "Books") says:

"It would be difficult to find a more suitable holiday gift for anyone suspected of biological leanings."

MAIL THIS COUPON TODAY!

RETAIL BOOK DEPT.,
SCIENCE NEWS LETTER
2101 Constitution Ave.,
Washington, D. C.

Send me.....copies of
THE MICROSCOPIC WORLD, by
Frank Thone, at \$3.00 per copy.

☐ I enclose remittance ☐ Send C.O.D.

NAME.....

ADDRESS.....

CITY & STATE.....



DOWN TO EARTH

Dr. Schmidt uses his facts gained in air views in patient hours of digging out fragile relics of the past.

over Cyrus the Great's capital and tomb, because some day there may be further discoveries there. But there will be no finding of the Persian king himself in the pomp and splendor of an Egyptian Tutankhamen. Within 200 years of his death, Cyrus was routed out of his golden coffin and his tomb was plundered of regal possessions by an invading army. Soldiers of Alexander the Great, without Alexander's knowledge, looted the tomb of Cyrus.

It has been believed that the capital where Cyrus ruled as founder of the Persian Empire was mainly a governmental area, a place of palaces and parks with no continuous settlement of houses and shops. Air views now support this

belief, though Dr. Schmidt cautiously suggests that floods and farming might have flattened out any residential areas that existed, hiding them completely.

There still remain mounds of earth at Pasargadae—as the first Persian capital was called—which have not been probed at all. And the fortified area of the capital, the enclosure of which was first discovered from the air, offers attractive possibilities for learning more about one of the great rulers of long ago.

Persepolis, which became the capital of the Persian Empire under Darius, and which was first occupied and then wrecked in Alexander's world march, has within recent years been unearthed by an expedition working under the auspices of the Oriental Institute, Chi-

cago, the University Museum of Philadelphia and the Boston Museum of Fine Arts.

Much more about Persia's part in world history has been revealed as a result of such digging. The names of the nations of Xerxes' famed empire were found engraved on cornerstone tablets, and beautiful reliefs emerged from the debris of the palatial structures of Persepolis.

Genghis Khan's Mongols and Tamerlane the terrible are among invaders who have wrought destruction to Iran's beautiful cities. The city of Rayy, in its time the most sumptuous city in the world next to Baghdad, fell prey to both these conquering hordes.

Science News Letter, December 14, 1940

MEDICINE

Radium and X-Ray Treatment Advised for Brain Tumors

BRAIN tumors can be successfully and safely treated by large doses of radium or X-rays, Dr. Ira L. Kaplan, of Bellevue Hospital and New York University, reported to the Radiological Society of North America, meeting at Cleveland.

New knowledge of radiation treatment, Dr. Kaplan said, enables physicians to use larger, and therefore more effective, doses than they dared to use in the past when it was feared such doses might harm the brain tissue as well as destroying the tumor.

In most cases, he said, radiation treatment should follow surgical treatment, but in some cases irradiation alone produces the desired results.

Science News Letter, December 14, 1940

acts, it was explained, by stopping bone growth. In the four cases reported Dr. Spangler said the X-ray treatments gave a more uniform result than surgical treatments, although the X-ray treatments took longer to accomplish the result.

Science News Letter, December 14, 1940

Soviet agriculturists report that cucumbers, radishes and lettuce are being grown in *northern areas* where the temperatures may drop to six below freezing Centigrade in July.

To provide a *clear road* for fast cars up and down a long hill near Nashville, Tenn., a separate lane of red concrete has been constructed for slow trucks climbing the grade.

Shorten Legs of Cripples

THE crippling effects of infantile paralysis or other ailments which leave the patient with one leg shorter than the other can be overcome by X-ray treatments to shorten the longer leg, Dr. Davis Spangler, of Dallas, Texas, reported.

Success with such treatment of four patients from the Scottish Rite Hospital for Crippled Children was reported by Dr. Spangler.

The idea of the treatment is that short legs of nearly equal length are preferable to legs of unequal length. Various surgical methods of equalizing leg length have been tried. The X-ray treatment

Don't Delay

getting that new book you want to read. SCIENCE NEWS LETTER will gladly obtain for you any American book or magazine in print. Send check or money order covering regular retail price (\$5 if price is unknown, change to be returned) and we will pay postage in the United States. When publications are free, send 10c for handling. Address:

Book Department

SCIENCE NEWS LETTER

2101 Constitution Ave. Washington, D. C.

LANGUAGES Made *easy* By LINGUAPHONE

This amazing new Method enables you, in your own home, to speak and read any of 27 foreign languages in an incredibly short time. Endorsed by leading university professors and thousands of men and women as the quickest, simplest and most thorough language method. Send for FREE book.

LINGUAPHONE INSTITUTE
31 RCA Building New York City

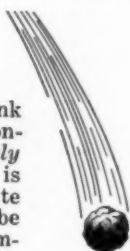
CHRISTMAS INNOVATION!!

IMMEDIATELY upon publication of last week's Announcement of an *increase* in the number of available memberships for 1941 THINGS of science—many people asked if they could give one or more memberships as Christmas Gifts. This was not the original plan, but so many asked the privilege, that we now announce that Gift Memberships may be had for adults or for children in school or college. If you wish to use THINGS of science as an unusual gift remembrance, please fill in the coupon below and send it to us, with your remittance.

What will Members get in the units of THINGS which start 1941?

METEORITE UNIT

Members will receive an actual chunk from the heavens, a pebble of iron-nickel meteorite—one of *Earth's only imports* from the outer space! It is certified to be an actual meteorite fragment such as can usually be viewed only in certain museums. Members will also receive some of the sand pulverized by the tremendous *impact* of one of the largest meteorites ever to hit the Earth. With these materials members will receive a stirring explanation of this unusual exhibit.

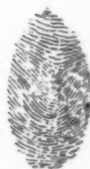


FABRICS UNIT

Members will receive a piece of *cloth spun from glass*; a tuft of fiber *made from milk* which feels like wool; a silk-like cloth made from *salt, coal, lime and air*; a sheet of paper that feels like cloth; and other new fabrics which are products of scientific experiment.

FINGERPRINT UNIT

Fingerprinting is in the news these days. One thinks of impressing an ink-smudged finger on paper—a messy business. Members will receive an *inkless fingerprinting outfit* with material good for many impressions. There will be a purse fingerprint card that may sometime be useful to you in cashing a check, and two official complete fingerprint record documents which may be registered with the Government or kept in your safety deposit box. We'll tell you *how to classify* the arches, loops, whorls and composites in yours or any fingerprints.



New—THINGS units on Taste, Plastics, Heredity, Odors, Milk, Metals, Archaeology, to name a few of the units on which the Staff of Science Service is now working.

MESSAGE TO SCHOOLS

In addition to a clear explanation of the material in each unit of THINGS, we will supply a museum-style legend card of bristol board for use in a laboratory display cabinet. Instantaneous and enthusiastic was the gratification expressed by teachers for this feature when we announced it in connection with the first series of THINGS units.

IF IT HAPPENS

that you did not read last week's Announcement, here is a brief description of this unusual new membership opportunity. The new organization, increased to 5,000 members, is sponsored by Science Service, the non-profit institution for the dissemination of scientific knowledge.

Members are privileged to look at, try out, feel—and OWN unusual THINGS of science, three units of which are described in the column at the left.

To each member of the group of friends of science, we will each month dispatch a *unit of scientific material*, unusual, intriguing, surprising. With each unit we supply a brief, clear explanation of its contents.

Since this is a non-profit organization, THINGS will not attempt to make money, so the membership charge has been set at \$4. Every member will get the full measure of interest and curiosity-satisfying knowledge from his monthly unit of THINGS.

The new membership period will reach from January 1941 through December 1941, during which time each member will receive *twelve* units of THINGS, one each month.

To give a THINGS membership as a Christmas Gift, please use the Application Form which follows. If you wish to make the presentation to more than one person, please supply their names and addresses on additional paper and remit \$4 for each.

GIFT MEMBERSHIP COUPON

To *Things*

2101 Constitution Avenue, Washington, D. C.

Please enroll the following as a member of your new science group. I enclose \$4 for this membership which pays in full for the twelve units to be dispatched monthly, postage prepaid, from January 1941 through December 1941.

Mail to.....

Mailing Address.....

City & State.....

My own name and address is:

.....

.....

PHYSICS

Mysterious "Phosphors" Give Cold Light for Television

Finding That Crystals of Luminescent Materials Can Change Electrons Into Light, Experts Make Tele-Eyes

See Front Cover

THE WOODS are spooky when decayed tree branches become phosphorescent and glow in the dark. In much the same way, faces of clocks shine in the night if the hands and figures of the hours are phosphorescent. And everyone is familiar with the uncanny gleam of the cat's eyes as they "shine" in the darkness. Now, science, emulating the human eye in television, goes the cat one better. While the cat's eye merely reflects light, the "eye" or screen of the tele-receiver actually produces "cold light."

The trick is based on luminescence—"light emission not directly attributable to heat." Jostling old traditions, customs and devices as it electrified and modernized them, radio now takes up the age-old art of luminescence, applying it to man's conquest to "see at a distance." For the art of luminescence, optics and lenses, radio research promises much that is new. They are keys to the future of television.

Having caught the clue that tiny crystals of specially synthesized luminescent materials have the unique property of transforming electron energy into light, the research experts now fashioning kinescopes or "tele-eyes," are delving deeply into the historical, theoretical and practical features of the effect.

Revealing hitherto unpublished data, Humboldt W. Leverenz, of the RCA Laboratories, discloses that the art of luminescence is having a rebirth, although synthetic luminescent materials

have been known for 337 years. He explains that the term "cold light" is concisely descriptive of these "glow materials." And he goes on to point out that in television a scientific word—"cathodoluminescence"—comes into prominence. The name is derived from the fact that light emission is occasioned by cathode rays or electrons, which are electricity in buckshot form, that impinge on luminescent matter.

Alchemists were a long, long way from television when, in 1603, they synthesized phosphors by crude methods, such as by heating oyster shells with sulphur to produce a feeble violet-phosphorescence. Now, along comes television to accelerate the old oyster shell technique. The intense search of literature on the subject of luminescence has disclosed, according to Mr. Leverenz, "a plethora of phosphor recipes," but, to complicate the problem, few work successfully.

First of all, to serve on the cyclike screen of radio, a luminescent ingredient must be Simon pure; in fact, it must possess a degree better than "spectroscopic purity," as Mr. Leverenz describes it. To the visitor the laboratory looks like a hospital operating room. And, incidentally, the air is kept so pure that a burning gas flame is invisible; there are no impurities to burn.

To reveal the complexity of the trick, Mr. Leverenz calls attention to the fact that there is no theory of luminescence adequate to explain quantitatively all the properties of known phosphors, or to

predict the properties of new ones. But he does know that in regard to luminescence, so vital in television, all efficient phosphors are definitely crystalline. But those intended for the kinescopic "eye," must give off light of a color that the eye can easily see, if maximum efficiency is required. Therefore, all phosphors are not suitable for television.

Many factors must be taken into consideration in fashioning retinas for television. Evidence that eleven years of intensive television-luminescence research in the RCA Laboratories have been capped with success is found in the statement by Mr. Leverenz that the kinescope now can provide high enough levels of flicker-free picture brilliancy to be adequate, not only for the normal eye, but also for the defective eye. He quotes statistics to report that approximately two-fifths of the population, comprising millions of people, have defective visual functions which must be considered in establishing a public service such as television.

Science News Letter, December 14, 1940

PHYSIOLOGY

Colchicine Experimenters Warned of Possible Danger

COLCHICINE, the "magic drug" that speeds up evolutionary processes in plants by doubling chromosome numbers, may be dangerous if not handled with proper precautions, Dr. Haig Dermen of the U. S. Department of Agriculture warns the hundreds of enthusiastic amateur experimenters now engaged in trying to produce strange and possibly valuable new varieties.

Animal tissue is much more sensitive than plant, to the effects of colchicine, states Dr. Dermen. A minute quantity of the solution, of the concentrations used on plants, might cause blindness if it got into a person's eye, or might produce skin irritation if carried to the face.

Up to the present at least, colchicine has had no scientifically valuable effects when used in attempts at producing new varieties of animals. Most of the experiments on animal cells simply resulted in the death of the cells. There have recently been some reports of modifications of the colchicine treatment, using much weaker solutions that may have induced chromosome doubling in animals without killing the cells. However, to date the outcome of these experiments has been so equivocal that for persons desiring dependable and practical results work with plants continues to be much more promising.

Science News Letter, December 14, 1940

Science News Letter Subscription Coupon

To Science News Letter, 2101 Constitution Avenue, Washington, D. C.

☐ Start my subscription to SCIENCE NEWS LETTER for ☐ 1 year, \$5
☐ Renew ☐ 2 years, \$7

Name _____

Street Address _____

City and State _____

(No extra postage to anywhere in the world)

CONSERVATION

NATURE RAMBLINGS

by Frank Thone



Christmas Greens

YULETIDE preparations, in olden days, presented no great problem. The lord of the manor sent his serving-men out into the woods to hew down branches of evergreen and holly and mistletoe. They nailed them up in the feasting-hall, strewed fresh rushes on the floor, and everything was ready.

Nowadays the problem isn't so easily solved. We have a bigger population, largely unorganized, and almost wholly built on an individualistic basis. No more great feasts in manorial halls; one-family gatherings in separate homes are the rule now. Instead of mass gatherings of decorations in the almost limitless forest, we have individual forays in the family auto, or even more frequently simply an excursion no farther than the corner store to buy our Christmas wreaths and garlands over a prosaic counter.

Therein lies the danger to our already perilously diminished woodlands. The unknown ultimate suppliers of holiday greenery for the market are all too frequently irresponsible persons who go out with trucks, to raid land that is not their own, and who make their collections in disregard both of the proper owner's rights and of the mischief they may be doing to the forests and the land, regarded as long-time national assets. It is therefore wise to make your purchases with this situation in mind.

Two items should be on everybody's boycott list: native holly and ground pine. So serious has the stripping of Eastern and Southern woods of native American holly become that in some states it is a jailable offense to be caught with holly branches, unless you can prove that you cut them with the owner's consent, or that they are from your own land. Better buy the greener-leaved, brighter-berried European holly, now

grown in this country especially for the Yule market.

Ground pine receives less legal protection than holly, though it really merits more, because it is often the only ground cover that exists on the loose, sandy, easily erodible soils that form the forest floor in many of our conifer woodlands. The best thing to do about ground-pine wreaths is to let them lie unbought, and get something else. There are plenty of quite acceptable substitutes that cost less and do not dry out so quickly.

There are at least two kinds of Christmas greens that as yet have no particular objections to meet from the conservation point of view: mountain laurel and mistletoe. Mountain laurel is so abundant as to be considered a weed shrub in many places, and mistletoe is a parasite on trees, actually doing them harm. Foresters, although they are as romantic as the next fellow, would nevertheless have no regrets if mistletoe were cut down to a small fraction of its present abundance.

Science News Letter, December 14, 1940

BIOLOGY

Sponge-Killing Epidemic Ends in Florida-Bahamas

THE deadly epidemic that was raging in the sponge beds of Florida and Bahamas waters last spring has died out—but, unfortunately, so have most of the sponges. Dr. Paul S. Galtsoff, biologist of the U. S. Fish and Wildlife Service who is back in Washington after a comprehensive survey of the sponge-producing areas, reports that the disease, before it abated, killed off about 75% of the commoner grades of sponges and nearly 90% of the finer kinds.

The industry is flat on its back until a new crop of sponges can grow, and that is a slow process, requiring several years. In the meantime, artificial sponges made of a cellulose compound are making heavy inroads into the market once held by natural sponges, and it is a question whether the latter will ever be able to recapture the lost sales territory.

The sponge-killing disease was caused by a fungus, that spread like wildfire through the warm waters where sponges grow. Nothing could be done against it, and its disappearance has been as unaccountable as its sudden outbreak was some months ago. It is hoped that the surviving sponges, hope of a new crop, represent resistant or immune strains that will found new and hardier races of sponges, but there is not real assurance that this is true.

Science News Letter, December 14, 1940



IN

SCIENCE—new discoveries presented in illustrated, non-technical form?

Plant Experiments in the home—Colchicine the easily applied evolution drug—Soilless Gardening and a host of others?

Medical discoveries, Vitamins, New Experiments now under way?

Round-Table-of-Ideas—Suggestions for applying new discoveries to your business—Ideas for starting new businesses?

Sources of supply for such items as, Low cost F.M. radio sets—Alnico magnets—Ceropyhl (vitamins in grass)—Pure vitamins—The MT-Scope (locates buried metals by radio waves)—Plant chemicals, including colchicine, colchisalve, vitamin B-1 tablets, soilless salts and other unusual plant chemicals?

★

All these appear monthly in **QUEST Science Summary**, a widely read, valuable, new, different and intensely interesting magazine of popular science.

SPECIAL OFFER—to introduce **QUEST** Send 25c for a sample copy **NOW**, and you will receive in addition, the Bryophyllum leaf pictured below.

OR . . . remit \$2.00 **NOW** for a year's subscription (12 issues) and we will be very glad to send without charge both the Bryophyllum and the Alnico super-magnet pictured below.

GIFT SUBSCRIPTIONS

. . . card of acknowledgment to recipient and, if desired, free-offers will be sent to one address, subscription to another.



You will be interested in this rare sprouting leaf—a curiosity from tropical countries—Pin it to a curtain or place it on soil. New plants bearing clusters of lantern shaped flowers will sprout from each notch.

ALNICO

Developed by G.E. It is, as the name implies, an alloy of aluminum, Nickel and Cobalt. It is the most powerful and persistent magnet known. Can be used to collect magnetic and meteoric dust from plain sand. On your office desk, it will create much interest—1½" high.—Sent with purchase of \$2.00 subscription, if requested, or for \$1.00 each, \$1.50 per pair.

Send to

QUEST, INC. — B-1
Wellesley, Mass.

•First Glances at New Books

EXPLORATION

ULTIMA THULE, Further Mysteries of the Arctic—Vilhjalmur Stefansson—*Macmillan*, 383 p., illus., \$3.50. Real mysteries as intriguing as any in fiction are set forth in this book. Where Greek Pytheas, once derided as "champion liar of antiquity", went on his long northern voyage to Ultima Thule, and whether Columbus actually visited Iceland are debated pro and con by Prof. Stefansson, who summons the evidence thus far available for both sides.

Science News Letter, December 14, 1940

CONSERVATION

THIS IS OUR LAND, The Story of Conservation in the United States—E. G. Cheyney and T. Schantz-Hansen—*Webb Book Pub. Co.*, 337 p., illus., \$3. With books on conservation constantly multiplying, the feeling may grow this is becoming a too-oft-told tale. Yet so long as there is an eroded hillside, a polluted stream, a community impoverished by reckless misuse and waste of resources, the story has not been told often enough. This book brings new point and emphasis to the telling, with vividly written text balanced by striking illustrations and diagrams. Cartoon frontispiece and foreword are by "Ding" Darling.

Science News Letter, December 14, 1940

CONSERVATION

CONSERVATION AND CITIZENSHIP—George T. Renner and William H. Hartley—*Heath*, 367 p., illus., \$1.60. A textbook, carefully prepared and excellently illustrated, on a subject that is attracting increasing attention nowadays as an integral part of education. Although intended for school use, it can be read with profit by parents as well as pupils.

Science News Letter, December 14, 1940

PSYCHOLOGY

THE PSYCHODYNAMICS OF ABNORMAL BEHAVIOR—J. F. Brown with collaboration of Karl A. Menninger—*McGraw-Hill*, 484 p., illus., \$3.50. See page 377.

Science News Letter, December 14, 1940

NUTRITION—HISTORY

THE AMERICAN AND HIS FOOD, a History of Food Habits in the United States—Richard Osborn Cummings—*Univ. of Chicago Press*, 267 p., \$2.50. This is a different and most unusual book about food. It tells, as the title suggests, about the kind of meals Americans used to eat and why they eat such different

kinds today. The role of refrigerators, railroads, nutritionists, welfare workers, droughts, depressions and agricultural surpluses, in changing the eating habits of the nation is explained.

Science News Letter, December 14, 1940

PSYCHOLOGY

THROUGH CHILDREN'S EYES—Blanche C. Weill—*Island Workshop Press, New York City*, 365 p., \$1.75. A group of narratives—"true stories out of the practice of a consultant psychologist"—which should be helpful to parents puzzled about how to handle their children with wisdom.

Science News Letter, December 14, 1940

AERONAUTICS

AIRPORTS: Some Elements of Design and Future Development—John Walter Wood—*Coward McCann*, 364 p., 64 diagrams, 444 illus., \$12.50. Mr. Wood, an architect specializing in airport design, has produced in this elaborate and copiously illustrated work a book that will be of interest to the general reader interested in aviation as well as to those more directly and professionally concerned. Forty-eight airports, in and outside of the United States, are compared, with plans of each, pictures of their features and a full discussion of their faults and virtues.

Science News Letter, December 14, 1940

ARCHAEOLOGY

FLIGHTS OVER ANCIENT CITIES OF IRAN—E. F. Schmidt—*Univ. of Chicago*, 96 p., plates, \$20. See p. 378.

Science News Letter, December 14, 1940

ELECTRICITY

THE BOY ELECTRICIAN (Rev. ed.)—Alfred P. Morgan—*Lothrop, Lee & Shepard*, 403 p., illus., \$2.50. Full of "how to make it" directions, this should be an ideal Christmas gift for the electrically inclined youngster. Despite the title, girls also might be interested. Certainly they should be familiar with electricity since, when they grow up, they will have many contacts with electrical apparatus in the home.

Science News Letter, December 14, 1940

GENERAL SCIENCE

SCIENCE, A Story of Progress and Discovery (Rev. ed.)—Ira C. Davis and Richard W. Sharpe—*Holt*, 495 p., illus., \$1.72. A general science text for high schools in revised edition.

Science News Letter, December 14, 1940

BIOGRAPHY

MY BOYHOOD IN SIAM—Kumut Chandruang—*John Day Co.*, 226 p., \$2. A book of distinction, first, because the publishers express the belief that it is the first book about Siam written in English by a Siamese, but secondly, and more importantly, because it has literary charm and dramatic interest. Despite the title, which is the sort often given to juvenile travel books, this is a biography to hold adult attention. *It would make a good Christmas book.*

Science News Letter, December 14, 1940

GEOGRAPHY

GREENLAND LIES NORTH—William S. Carlson; Illus. by Phyllis Wesley—*Macmillan*, 306 p., \$3. The lively flavor of this book about Greenland is suggested by chapter headings, for example: "Eskimo Ways and Means", "Arctic Coal Mine", "Week-Ending with Eskimos", "Toughening Up", and "Ramparts of the Ice Kingdom". The author and a friend spent a winter at a frozen outpost of Greenland, in order to study winter air currents.

Science News Letter, December 14, 1940

ORNITHOLOGY

WINGS AT MY WINDOW—Ada Clapham Goven—*Macmillan*, 198 p., \$2.50. Besides being a fascinating story about taking care of bird neighbors and learning about them, this is also a great human-interest document: of a woman who found her way out of the Slough of Despond, conquering grief and physical disability, because a chickadee once sang to her in acknowledgment of a handful of crumbs to eat.

Science News Letter, December 14, 1940

GEOGRAPHY—JUVENILE

GOING PLACES—William Wolfson—*Coward-McCann*, illus., by author, \$1.50. Physical geography made truly simple and attractive for children aged about eight to eleven. The artist-author tells, as he told his own son, what life is like for eight boys in a cold place, a hot place, a high place, a dry place, and so on.

Science News Letter, December 14, 1940

BACTERIOLOGY

MICROBIOLOGY LABORATORY MANUAL—Paul W. Allen and George M. Cameron—*Mosby*, 243 p., illus., \$2. Spiral-bound laboratory workbook, including prepared outline pages for sketches of colonies on slants and plates.

Science News Letter, December 14, 1940